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DATE	SUBJECT
7 Jan 71	Highlights COMIREX Meeting Thursday, 7 Jan 71
19 Jan 71	ARGO Meeting, EOB January 13, 1971
12 Jan 71	II Report - Space Research, Development, & Plans Revealed at XXI International Astro. Congress, 4-10 October 1970 Constance
18 Jan 71	Application of Space Tech. to Study of Man's Environment
18 Jan 71	Application of Space Tech. to Study of Man's Environment
8 Feb 71	DCS Case 55,819 - Soviet Satellite Photo of U.S. East Coast
10 Feb 71	ERTS & SKYLAB Meeting
17 Feb 71	Cable In 70335
26 Feb 71	Cable In 71011
26 Feb 71	12th Semi-Annual Research Summary December 1969 - May 1970
Mar 71	Cable In 71232
29 Mar 71	Global Photo of Earth & Possibilities for Interpreting ITS Data
5 Apr 71	Agenda for May Meeting
15 Apr 71	ARGO Committee May Meeting
12 May 71	Visit to NPIC by ARGO and AID Representatives
28 May 71	ARGO Meeting, Room 476, EOB 26 May 1971
28 May 71	Brief Highlights (COMIREX) 27 May 1971

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1971

Part I

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MAY

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25X1

TOP SECRET

WORKING PAPER

25X1

28 May 1971

MEMORANDUM FOR THE RECORD

SUBJECT: ARGO Meeting, Room 476, EOB, 26 May 1971 - 9:30 A.M. - 12:00 P.M.

Chairman, called the meeting and introduced 25X1
who presented the two briefers on transducers for a real-time system. of OSP briefed on the solid state system and of NRO/West 25X1
Coast briefed on return beam vidicon, laser scanners and tape storage systems. The purpose of these briefings is to update the civilian agencies with advanced state-of-the-art in order that they might not waste resources on obsolete or cruder systems.

The clearance level was an "ersatz" TKH in order to avoid multiple one-time clearances. A need-to-know caution was 25X1
announced regarding spreading the picture of NRO's efforts around the civilian agencies. While the briefers held back the total state-of-the-art extent and talked 50' and 30' to 100' systems, the system's capabilities seemed quite apparent to the scientific types present.

announced that NASA will receive U-2's for operation. He 25X1
noted that this will change the function of ARGO regarding channeling U-2 coverage requests to NRP (except to supplement NASA). He asked that the committee review its function and needs and how, if necessary, should it change. Reston stated it was negotiating with NASA regarding handling storage and "sales" for NASA's U-2's and possibly indexing. querried whether there was any ARGO role for the NASA U-2's and the 25X1
effect of the first ERTS on the ARGO function. wanted the ARGO 25X1
to continue to help meet his needs (Interior). mentioned that 25X1
Rome and Wright - Pat had advised them to come direct to them for use of their U-2's. noted that ARGO should not manage direct inter-agency 25X1
civilian functions but noted there were now three separate channels 25X1
for coverage. closed the discussion with the statements that he 25X1
and would do some homework and set-up discussion on this for 25X1
next month. commented that after his own experience with ARGO 25X1
and his review some months ago with the "Assistant Secretaries" of the civilian departments, he felt ARGO still had a role regarding information exchange, satellites and other matters.

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[redacted] reported that he and [redacted] would meet with [redacted] head of OEP, to revive the dormant "disaster report" which had recommended a central setup.

[redacted]

NPIC ARGO Representative

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25X1

25X1

12 May 1971
Copy 3

MEMORANDUM FOR: Chief, Operations Division, IEG

THROUGH : Chief, Technical Planning Branch, OD

SUBJECT : Visit to NPIC by ARGO and AID Representatives

1. of ARGO and Messers 25X1
of AID visited NPIC/IEG on Tuesday, 11 May 1971. 25X1

2. The purpose of the visit was to view coverage of 25X1
East Pakistan to determine the status of transportation and material handling facilities. Knowledge of the condition of these features is required as input to a pending decision to provide U.S. helicopters for supply distribution.

3. The visitors were taken to the SEAB/IEG and given a briefing by They also inspected the film of the covered 25X1
areas.

4. The quality and quantity of coverage was not sufficient to form firm conclusions. When told that was due in this 25X1
coming weekend they asked if they could return Monday afternoon to see the new coverage. I advised them this was possible. They will contact me on Monday after I determine that the new coverage will answer their questions.

/s/

25X1
IEG ARGO Representative

Distribution:
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WPL

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY
WASHINGTON, D.C. 20506

April 15, 1971

25X1

Copy to [redacted]
will arrive
call in due
Nairobi

MEMORANDUM FOR

ARGO Committee

SUBJECT: ARGO Committee May Meeting

I have been informed that the NASA-sponsored International Workshop on Earth Resources Survey Systems scheduled for May 3-14, 1971 will preclude the attendance of many of the ARGO principals at the May 4 ARGO meeting. I have therefore rescheduled the ARGO Committee meeting for May 26, 1971 at 0930.

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[redacted]
Chairman, ARGO Committee

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EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF SCIENCE AND TECHNOLOGY

WASHINGTON, D.C. 20506

May 11th & 18th ok :)

4113 (IVD-SA Seminar)

April 5, 1971

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MEMORANDUM FOR

ARGO Committee

SUBJECT: Agenda for May Meeting

Arrangements have been made through the NRO to present a briefing to the ARGO Committee on the various image transducer technologies (readout) which the intelligence community has pursued and to present a current status in this area. This presentation is scheduled for 0930, May 4, 1971 in Room 213.

The briefing, which will take approximately two and a half hours, is the major agenda item. Should any member wish to have additional items placed on the agenda I would appreciate your letting [redacted] 25X1 [redacted] 25X1 know by April 15, 1971 so that the other members may be notified.

25X1

[redacted]

Chairman, ARGO Committee

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FOREIGN TECHNOLOGY DIVISION

NPIC

GLOBAL PHOTOGRAPHY OF THE EARTH AND POSSIBILITIES FOR INTERPRETING ITS DATA

by

B. V. Vinogradov and K. Ya. Kondrat'yev

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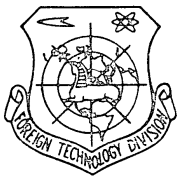

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EDITED TRANSLATION

GLOBAL PHOTOGRAPHY OF THE EARTH AND POSSIBILITIES FOR INTERPRETING ITS DATA

By: B. V. Vinogradov and K. Ya. Kondrat'yev

English pages: 18

Source: 20th IAF Congress, Mar del Plata, Argentina, 5-10 October, 1969, pp. 1-22.

Translated by: M. Olaechea/NITHC

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GLOBAL PHOTOGRAPHY OF THE EARTH AND POSSIBILITIES FOR INTERPRETING ITS DATA

B. V. Vinogradov and K. Ya. Kondrat'yev

Scientists have attempted to compose a complete image of Earth immediately after receiving area television images from the first meteorological artificial Earth satellites (AES). The first full representation of the globe was given as a photomontage of area television images received from Tiros-IV in 1960 (Fig. 1).

In subsequent years area television images of all (or almost all) of the Earth's surface were received from meteorological satellites Tiros, Essa, Nimbus, and Meteor in both the US and the USSR. So much graphic information was acquired that the main problem became one of processing, storing, and retrieving this information. The television montages received from the above-mentioned satellites made it possible to create a "space image" of the entire Earth and obtain a number of new global data, as for example, the distribution of the cloud cover over the Earth at different latitudes (Arking, 1964; Clapp, 1964).

However, any montage composed of area photos, particularly those which are greatly reduced in size, suffers from a number of significant disadvantages as compared to the noncomposite image:

1. scale distortion in overlapping images;
2. disparity in scale of mounted images;
3. instability of photographic reproduction;
4. marked boundaries between mounted images of different tone;
5. nonuniformity of illumination in the focal plane due to distortion of light by the objectives;
6. nonuniformity of photographic conditions of the individual frames;
7. interference in the separate sections;
8. difficulty of storing and using global information consisting of many area images.

These and many other factors account for the low decipherability of reduced area photomontages as compared to the noncomposite image and, consequently, difficulties in using them for global interpretations.

Let us recall that the attempts at the dawn of space photography to produce a space picture by reducing a mosaic of aerial photographs were just as unsuccessful. These experiments showed that no simulation of a super-small image scale by means of multiple degradation of the photomosaics of a larger scale could be successful (Lowman, 1965; Vinogradov, 1966).

Thus, upon receiving the mass of area images there developed problems in selective, transformating, mounting, and matching these images to produce photographs on a planetary scale. These problems explain the great interest in the feasibility of using artificial Earth satellites (AES), spaceships, and unmanned space stations for obtaining a single global image of the Earth's surface from trajectories far distant from Earth.

The global Earth photographs represent very high altitude supersmall scale photographs and television images of the entire illuminated disc of the globe from horizon to horizon or from the day horizon to the terminator. Due to the fact that the global

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photographs are taken from very great, but not infinitely great, heights, the image can not capture an entire earth hemisphere. Angular radius α of the hemisphere zone which can be captured by global photography is determined by photography height (H) and Earth radius (R):

$$\alpha = \arcsin \frac{R}{R+H} \qquad (1)$$

while the angular radius β of the arc encompassed by the photography is equal to:

$$\beta = 180^\circ - 2\alpha \qquad (2)$$

Thus, for example, in photographing from space station Zond-5 from a height of about 90,000 km α = 3°50', while β = 172°20'. In obtaining an image from the artificial Earth satellite "ATS-3" from a height of about 36,000 km α = 8°40', and β = 162°40'. In photographing from h = 2R it is theoretically possible to obtain a hemisphere image in the range of 141°00', at h = 4R – in the range of 157°00', at H = 6R – in the range of 163°40', etc. Thus, global photography makes it theoretically possible to obtain an image of most of the hemisphere from a height which is equal to no less than 1.5-2.0 diameters of the globe, i.e., from a height of more than 18,000-25,000 km.

The size of the useful global image of the Earth is somewhat (at least 10°) smaller than theoretically possible, since on the boundaries of the visible disk of the Earth the perspective distortions and the influence of the great optical thickness of the atmosphere are too great.

Beginning with 1966 global photographs were received from space station Zond-5 and -7, space vehicle Apollo, and artificial Earth satellites Molniya-I, and ATS-1 and -3 (Figs. 1-3).

The first global television image of the Earth was taken from a wide-angle camera, while the northern part of the Eastern Hemisphere was photographed by a narrow-angle camera from the Soviet communication satellite Molniya-I on May 30, June 9, and November 21, 22, and 23, 1966 from heights of 18,000-29,000 km (Burtsev et al., 1966; Solov'yeva, Sonechkin, 1968; Solov'yev, Solov'yeva, 1968). With the help of these images (Fig. 2) the basic cloud macrostructures were identified and the quantitative characteristics of the planet's cloud cover were determined. This experiment showed that television images from high-orbit artificial Earth satellites are very significant in meteorological interpretation of this type of data.

American researchers obtained the first global image of the Earth on December 9, 1966 from the data of a scanning telephotometer mounted on Earth satellite ATS-1 (Fig. 3). This satellite was launched into a synchronous equatorial orbit (height 35,880 km) and stationed above the Pacific Ocean at 151° W. The "ATS-I" made it possible to continuously follow the movement of the cloud masses and the development of storms and cyclone formations above the Pacific Ocean. These images are of great interest in global analysis of the structure of geographic, chiefly meteorological, macrocomplexes (Quain, 1967; The ATS, 1968). In addition the television images from the ATS satellite could be used for analyzing flow zones within the water area of the Pacific Ocean (La Violette, Chabot, 1967; Rasool, Hogan, 1969).

The first global color television image was received November 5, 1967 from the ATS-3 satellite, which had also been launched into geosynchronous equatorial orbit and stationed above the mouth of the Amazon River at 47° W. The ATS-3 satellite provided images of the cloud systems above the Atlantic Ocean, North and South America, and the eastern part of the Pacific Ocean, thus furnishing systematic access to meteorological data for this part of the world. Furthermore it was possible to use color images to distinguish the state of the vegetation cover and of the ocean water masses (Warnecke, Sunderlin, 1968; Suomi, 1968).

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The first original global photographs of Earth, returned to the ground in a container, were from the space station Zond-5. They were taken on the flight back to Earth (after orbiting the Moon) from a height of about 90,000 km on October 21, 1968 at 1200 hours Moscow time (Pravda, October 26, 1968). The images were of high photographic quality. A concrete analysis of the image is given below and an idea given of the possibility of its global and area interpretation.[1]

At present there are a number of global television images and photographs of Earth, obtained from the spaceship Apollo, which we have not yet analyzed, although they are no doubt of great value in global interpretation.

Photographing and interpreting global pictures from high orbits have a number of technical and methodological advantages over the usual systems of photographing from spaceships and artificial Earth satellites from low and average heights, in which area information is received and then a global montage assembled.

Among the advantages of global photography are:

the great (practically the maximum possible) area of coverage of the Earth's surface shown on one planimetric image;

synchronous receipt of information from remote territories of the entire hemisphere and an opportunity for almost constant (for geosynchronous orbit) tracking of the planetary processes and phenomena;

high speed of collecting and converting data on a planetary scale;

speed of transmission of television information to receiving stations;

a broader radio visibility zone for the direct transmission of the television global image and other information to Earth receiving stations, omitting the information storage phase;

the absence of a mosaic effect and photometric misalignment of area and regional images resulting from montage of photos varying in scale and quality and distortion associated with area photographic and television interference;

a more uniform resolution of the field of vision and regular variations in the geometric and photometric characteristics.

In addition, global images have a number of pecularities which complicate their analysis;

a very pronounced sphericity of projection and the difficulty associated with this of transforming a spherical image into a flat image;

irregularity of illumination of the Earth's surface, associated with the different height of the Sun in the different time zones and in different latitudes of the Northern and Southern Hemispheres, which must lead to difficulty in compiling images of objects which are analogous in tone.

These and certain other features of global images can be studied through stereophotogrammetric transformation and photometric development.

These technical and methodological advantages make it possible to study, with the use of global images, the largest planetary phenomena and their interrelation ship. The basic advantages of space photography (Vinogradov, 1966) were used:

(1) territorial integration, i.e., optical and geometrical generalization of the morphological elements of the landscape in forming a photographic image of geographical megacomplexes;

(2) factor integration, i.e., producing in one photograph the images of all the components of the geosphere – the atmosphere, lithosphere, hydrosphere, and biosphere.

Example of Interpreting a Global Photograph: Geographical Zones of the African Sector of the Globe

The global photographs which served in the interpretation were taken from the Zond-5 space station (Fig. 4). The interpretation was done from photographic prints magnified about 10 times. This assured full visual discernibility of the elements in the image. The Earth photographs were taken on the day of the autumnal equinox, thus assuring uniform illumination of the Northern and Southern

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Hemispheres and successful juxtaposing of images of analogous zones to the north and south of the equator. The basic element of the interpretation was geographical zones. We interpreted the geographical latitudinal zonality within the African sector of the globe from the terminator (about 50° W) to the daylight horizon (about 60° E).[2]

The basic zonality indicators were the tone and texture of the photographic image of the vegetation and soil cover. Here the distribution and form of cloud structures and the outlines and distinguishability of geological formations and hydrographic elements were studied.

In the photographs we can distinguish seven geographical zones and subzones within the African continent.

The zone of subtropical evergreen forests and shrubs is markedly discernible in the far north and south of the African continent (Fig. 5-1). It is cloudless and only individual orographic cumulus clouds are evident. The mountains and heights of the Atlas range are covered with oak and coniferous forests and dense shrubby growths, the Cape Mountains by "finbosch" – analogous to Mediterranean maquis. In the space photographs scleroplyllous woody-shrub formations appear as extended dots of dark grey and lightish grey tone, which repeat the orography of the relief. Valleys and intermountain depressions of this zone are occupied by grassy stretches and arable land. They appear as a low-contrast grey background.

Subtropical desert steppes and semideserts are represented by a formation of heloxerophytic underbrush and xerophytic grasses on the plains (Fig. 2, 3a). They are distinguished from the above-mentioned zone by a lighter, grey, and lightish grey lower-contrast image. Among the semidesert plains, mountains and heights with a broken relief and the thicker woody-shrub vegetation which mark the morphostructural outline of the territory are distinguished by a darker tone. Small halyophytic depressions, rare in this area, and the sandy massifs which accompany them appear as fine, light grey extended spots.

The tropical desert zone is more defined (Fig. 5-2). It is characterized by sparse xerophytic vegetation and the absence of a more or less defined soil cover. Within this zone we find the different types of deserts markedly defined, associated for the most part with the geological and geomorphological structure. In connection with this the image of this region is determined by geological-geomorphological conditions and bears the most contrast. The rocky and rocky-sand plateau is of a darkish grey or grey tone. Large sandy deserts are marked by points of an even lightish grey tone with sharp boundaries and compacted configurations. The highlands which form the background of the desert are distinguished by massive light grey and light points with a more or less contrasting tectonic-lithogenic texture with broken contours. River valleys, deltas, and certain oases can be traced by a dark tone.

The zone of tropical semideserts forms a boundary between the desert zone and the savannah and, as a rule, is visible, although in places, particularly in the maritime region, it is covered by cumulus clouds (Fig. 5-3b). The vegetation is of a thicker haloxerophytic xerophytic grassy-shrub variety. The image of this zone differs from that of the desert zone by a lower tone contrast and a darker (lightish grey) subintegral. Within this zone sandy massifs can be distinguished by a lighter (light grey) tone and the heights, which are composed of bedrock, by a darker (darker grey) tone.

The zone of dry (desert) savannahs occupies regions covered with xeromezophylic grasses and thorny trees (Fig. 5-4). Part of the zone is covered by cirrus and cumulus clouds indicating good weather. The region appears as an integral grey tone with even less of an image contrast of azonal landscapes with background. The swampy depressions and heights with savannahs are distinguished by low-contrast dark-tone points. Against the background of the dry savannah we see individual dust-sand wind currents. In southern Africa the dry savannahs are replaced by the dry subtropical steppes of the Veldt, which gives an analogous image on the global photograph.

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The zone of typical savannahs which are more or less covered by thick grass with scattered xeromezomorphic trees appears as a even low-contrast dark grey integral tone (depending on the phenological state), darker in the Northern and lighter in the Southern Hemisphere in the monsoon region of East Africa (Fig. 5-5). Against the background of the typical savannah the swampy depressions, elevations and mountains with moist savannahs are faintly seen as darker points and the treeless territories and massifs of cultivated land, as lighter points.

The zone of moist savannah and savannah tropical forests is covered mainly by a heavy cumulus and cumulonimbus cloud cover and appears several places around the edges of and at breaks in the cloud cover as an even dark (in the Northern Hemisphere) and a light grey (in the southern) tone (Fig. 5-6). The boundary of the moist savannah corresponds quite accurately to the distribution of the heavy cumulus cloud cover. Against the dark background of the moist savannah the internal texture, associated with landscape differentiation, is barely visible.

The zone of damp equatorial forest is covered almost entirely by thick cumulus, cumulonimbus, and other multi-layer cloud formations. Almost nowhere is its boundary visible. At certain breaks in the cloud cover portions of dry land with damp equatorial forest can be distinguished by the more intense dark tones (Fig. 5-7).

Within the range of the Atlantic Ocean water basin a latitudinal geographic zone can be distinguished by the distribution of cloud indicators, although not in as great detail as on dry land. Four latitudinal zones are discernible.

The zones of the subtropical warm current of the Gulf Stream and the Brazil Current can be recognized by the massive cloud structures of the southern boundary of the cyclonic circulations of the temperature latitudes.

The tropical tradewind zone within the range of the cold Canary Current, weakened after the summer of the Northern Hemisphere, is identified by individual thread-like structures of cirrus and cirrostratus clouds. Such formations can be traced from the Iberian Peninsula to Cape Vert. At corresponding latitudes in the Southern Hemisphere the cold Bengal Current, intensified considerably after winter, is clearly visible by the almost solid thin stratus and stratocumulus clouds.

The tropical zone within the range of the Northern and Southern Equatorial Current is marked by relatively weak cloud developments. In the Northern Hemisphere this takes the form of light cumulus and stratocumulus formations, in the south – cumulus formations, which, however, occupy only a small area.

Finally, the zone of equatorial convergence is clearly identified by a belt of thick cumulus clouds.

Regional Interpretation – Landscape Types of the Central and Western Sahara

Global images can also be used for obtaining rather detailed local information. As an example let us take the differentiation of the Western and Central Sahara into landscape types from a 20× magnification of the image of Africa received from the AS Zond-5 (Fig. 6). These topographical types combine native complexes of similar basic topography-forming processes, determined by lithological type (Vinogradov, 1967). Eight types of deserts (Vinogradov, 1962. Fig. 7) can be distinguished within the range of the Sahara:

I rocky plains,
II sandy massifs,
III halyophytic-clay depressions and oases,
IV sloping plains,
V alluvial plains,
VI low-mountain relief,
VII medium-mountain relief,
VIII coastal sea plains.

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Rocky plains are the most typical topography of the Sahara. Their relief is flat or gently rolling. Structurally they are either horizontal or slightly dislocated by the dense bedrock. The latter is either exposed or covered with a thin layer of rock debris. The vegetation is very sparse and has no effect on the photographic image. Tone and contour are determined by the lithological state, the geological structure, and the sculptural relief. Rocky plains appear as either an even, a mottled grey, or a dark grey tone with rather definite boundaries. The individual wadis which intersect the rocky plains are distinguishable by narrow bands of a lighter tone. The darkest tone indicates the typical rocky deserts — "hammadas" — composed of sandstone and rocky limestone covered with a dark desert varnish (i.e., black hammada). The "white hammada" comprised of chalks and limestone (Hammada Dra, Tounassine, Guir, Tenezrouft) are shown as an even grey tone. The "serirs," i.e., rocky deserts with a light sand-pebble alluviam cover (Serir Tibesti, Tenere) appear as an even grey and light grey tone with diffuse boundaries. Also appearing as a light grey tone are the rocky-sand deserts. Yet the latter are distinguished by a noticeable orientation of photographic elements (Yetti with an orientation of NW-SE, Djouf with SW-NE). Ridged rocky deserts ("dahras," "krebas") are distinguished by a grey, lightish grey tone with a noticeable curving structural striated contour (El-Hank).

Sand massifs in the Sahara obtain immense proportions. They are distinguished by their mezorelief forms, sand conditions, thickness of their sand mantle, and by combinations with other types of regions. The sand massifs appear as an even, absolutely homogeneous light grey tone and show compacted points with relatively marked boundaries. The most even and lightest grey tone indicates "ergs" — solid sand massifs of alluvial origin (Eiden-Moursouk, Great Western and Great Eastern Erg). Of a somewhat darker light grey are the thin sands alternating with sand-clay regions (sands of Kavar, western part of the Great Eastern Erg). In the sand massifs of alluvial origin thin layers of sand of a light grey tone alternate with darker portions of hammadas. In such sands we can see an aeolian orientation of ridges (NE-SW in the sand of Erg-Chech and W-E in the sands of Erg Iguidi).

Halyophytic-clay depressions and oases. This type of topography occupies the bottoms of large depressions, filled with proluvial-alluvial and lacustrine clays, sand, and saline deposits. They are often covered with a relatively young clay and saline crusts. At the margins of such depressions are oases.

Halyophytic depressions covered with saline crusts and salt sands are shown as isolated plains of a light and light grey tone (Sebha Melrhir, d'Ijuille, Mekerkhan, Azel-Mati) halyophytic depressions with moist surfaces, for example, Chott Djerid, can be identified by a fine mottled light grey tone with a sharp surrounding border of a lighter tone.

Around the borders of the depressions we see fine dark grey points of oases, even of those which do not exceed 5-10 km in length (Touggourt, Ouargla, In Salah).

The denudational sloping plains surrounding the mountains (Sahara Atlas), medium-mountain relief (Ahaggar, Tibesti) and certain elevated plateaus (Tademait, El-Eglab, Adrardes Iforas, Air) are characteristic of the Sahara landscape. The sloping plains of the Sahara are covered with a thin mantle of debris deposits ("regs"), and in this respect they are similar to the rocky plains of the hammadas. This is determined by their grey tone, a darker grey than that of the image of sand and alluvial plain. The relief of the sloping plains is characterized by a network of channels of trenched run-off, from the heights to the depressions. The outline of these channels can be seen in places on the photograph. Unlike the piedmont plains of Central Asia, on the sloping plains of the Sahara the more or less significant blankets of alluvial-proluvial deposits are absent. For the most part bedrock (as for example, Sahara piedmont) serves as the socle of the sloping plains. Characteristic of such plains is the presence of outliers, which appear as isolated fine points of a dark tone (this is especially apparent to the west of Ahaggar in Adrardes Iforas).

Sanitized Copy Approved for Release 2010/03/31 : CIA-RDP80T01137A000200010001-7 l zonality, the Ahaggar

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The alluvial plains in the Western Sahara occupy an insignificant area, since there are no existing rivers, and ancient river deposits have been subjected to aeolian processes. The alluvial plains are composed of sand-clay and pebble-sand-clay material and are occupied by "nebka" topography with a cumulus, sand-clay microrelief. They appear as a light grey and lightish grey tone and extend to the borders of the depressions and the dry terrestrial deltas of the ancient rivers Saura, Igargar, and Miyah.

The largest wadi valleys can be identified by the sharp curvilinear contacts of the various landscape types (for example, Wadi Saura and Igargar form a boundary between the sand and rock plain landscape. In other instances the wide wadi valleys present their own particular image. This consists of light curving belts of dry wadis filled with friable sediment deposited among the dark fields of metamorphosed rock of the heights and lower ranges (Wadis Igargar and Tilemsi). Apparent in places are darkish grey streaks of channels in these wadis with thicker vegetation against a background of relatively light sand and sloping plains (Wadis Igargar and Miyah).

The low-mountain ranges of the Sahara are very diverse in landscape. The most typical are the long, high, flat-topped plateaus at elevations of about 1000 m and higher composed of dense sandstone dissected by wadi, and bounded by high steep ledges. They appear as extended dark grey and grey points with sharp boundaries and a noticeable nonuniformity of tone within the range of the field (plateaus Tassili and Adrar). The hilly low mountains, which represent strongly eroded plateaus, can be distinguished by a lighter tone with noticeable dark points of outliers (Timetrim). Isolated low mountains composed of volcanic rock are distinguished by oval, compacted points of dark tone (Djebel ElSora, El-Harudj-El-Asad). Finally, the crest of the low mountain ranges (djebels) not exceeding 2000 m in height appear as extended curving streaks of a mottled darkish grey tone.

Medium ranges with a noticeable vertical zonality, the Ahaggar and Tibesti attain altitudes of 3000 m above sea level. They are shown as a dark tone with a deeply dissected mottled structure. The dark tone of the medium-range mountains is determined by the dark brown coloration of the intensely metamorphosed sandstone of which they are composed and by the deep vertical ruggedness of the rocks. Characteristic of the deserts of the medium-range mountains are steep slopes which break sharply and disappear beneath the friable alluvial-proluvial sediment which covers them. This results in the sharp boundaries where the bedrock emerges and the strong tonal contrast between the dark highlands and the grey and lightish grey intermountain depressions and piedmonts sloping plains. The darkest, almost black compacted points depict the largest peaks of the Atakora and the Tibesti, which exceed 3000 m above sea level.

The lowland sea plains are composed chiefly of friable marine deposits which have been subjected to continential processes. Their relief is flat and gently rolling. Their photographic tone is an even light and lightish grey. They border the seacoast in a wide band, interrupted only by the darkish grey points of high elevations, composed of bedrock.

Conclusions

Thus global photography and televisized images of the Earth have valuable advantages. Their interpretation combines both an over-all and a detailed view.

In global photographs and television images the basic features of the natural megastructures of the globe can be seen:

in geographical interpretation – geographical latitudinal zones, geographical regions, countries and topography types; a contrasting view of far-distant landscape-analogies;

in meteorological interpretations – global distribution and dynamics, latitudinal and meridian interaction of cloud structure, the relationship of meteorological processes above the oceans and continents; observations of cyclones and storms;

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in oceanographical interpretation – the configuration of frontal zones of cold and warm ocean currents and zones of convergence; their seasonal fluxuation;

in geological interpretation – elements of geological megastructures and planetary faults;

in geomorphological interpretation – the distribution of macro-complexes of relief types, the drift path of regional aeolian material and the formation of the aeolian relief;

in geobotanical interpretation – the structure and distribution of mega- and macrocombinations of vegetation, phytographic zones and regions, and phenological rythms;

in soil interpretation – the structure and distribution of soil zones and regions in seasonal rhythms of soil moisting;

in the study of other processes and phenomena of a global and regional nature on the Earth's surface.

In photographing Earth geosynchronous artificial earth satellites at a distance of more than 18,000-25,000 km (for example, a system of four equatorial and two polar earth satellites) can be used. Particularly promising is the prospect of a stationary laboratory on the Moon with a system for transmitting and sending global images of the Earth's surface in the equatorial plain to Earth. Also of great importance are all facultative global images received from spaceships and space stations launched into outer space.

Summary

The global photographs obtained from high-orbiting satellites Molniya, ATS, and spaceships Zond and Apollo represent supersmall-scale space photographs or televised images of the Earth. Methods of using them for obtaining both global and area information on the natural complexes of the Earth's surface – the geographical zones and topography – are discussed.

References

1. Bugayev, V. A., T. P. Popova, B. S. Chuchkalov, D. I. Stekhnovskiy, and V. I. Solov'yev. (1969). Analiz sostoyaniya atmosfery nad zemnym sharom po snimku s vysoty 90,000 km, poluchennomu kosmicheskoy stantsiyey "Zond-5" (Analysis of the Condition of the Atmosphere Above the Earth's Surface According to a Photograph Taken at a Distance of 90,000 km Obtained From Spaceship "Zond-5"). Meteorologiya i gidrologiya, No. 7.

2. Burtsev, I. A., et al. (1966). "Molniya-1" peredayet izobrazheniye Zemli iz kosmosa ("Molniya-1" Transmits an Image of the Earth From Space). Meteorologiya i gidrologiya, No. 12.

3. Vinogradov, B. V. (1962). Geograficheskiye zakonomernosti dal'ney ekstrapolyatsii priznakov deshifrirovaniya landshaftov-analogov (Geographical Regularities of Long-Range Extrapolation of the Deciphering Features of Landscape-Analogs). Coll. Primeneniye aerometodov dlya izucheniya gruntovykh vod. AN SSSR, M.-L.

4. Vinogradov, B. V. (1966). Kosmicheskaya fotografiya dlya geograficheskogo izucheniya Zemli (Space Photography for the Geographical Study of the Earth). Izv. VGO, Vol. 98, No. 2.

5. Solov'yev, V. I., and I. S. Solov'yeva (1968). Kartografirovaniye snimkov oblachnosti, poluchennykh so sputnikov "Molniya-1" (Mapping Cloud Photographs Received from Satellites "Molniya-1"). Tr. GMTs SSSR, No. 30.

6. Solov'yeva, I. S., and D. M. Sonechkin (1968). Eksperimenty po televizionnoy s"yemke Zemli so sputnika "Molniya-1" (Experiments in Televised Photography of the Earth from Satellite "Molniya-1"). Tr. GMTs SSSR, No. 30.

7. Arking, A. (1964). Latitudinal Distribution of Cloud Cover from Tiros III Photographs. Science, Vol. 143, No. 3606. The ATS Meteorological Data Catalog, Vol. 2, 1968. Meteorological Catalog for the Application Technological Satellite, NASA. Goddart Space Flight Center, Greenbelt, Maryland.

8. Clapp, P. F., (1964). Global Cloud Cover for Seasons Using Tiros Nephanalyses. Month. Weath. Rev., Vol. 92, No. 11.

9. Lowman, P. D., (1965). Photography of the Earth from Sounding Rockets and Satellites: A Review. Photogramm. Engng., Vol. 31, No. 1.

10. Quain, R. H. (1967). ATS-1 Camera Experiment Successful. Bull. Am. Met. Soc., Vol. 48, No. 1.

11. Rasool, S. I., J. S. Hogan (1969). Ocean Circulation and Climatic Changes. Bull. Am. Met. Soc., Vol. 50, No. 3.

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13. ABSTRACT

The global photographs obtained from high-orbiting satellites Molniya, ATS, and spaceships Zond and Apollo represent super-small-scale space photographs or televised images of the Earth. Methods of using them for obtaining both global and area information on the natural complexes of the Earth's surface - the geographical zones and topography - are discussed.

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12. Vinograndov, B. W. (1967). The Landscape Concept and its Use in the Study of Grassland Territories. Publ. ITC-UNESCO Centre for Integrated Surveys, Delft, p. 16.

13. Suomi, V. E., J. A. Parent (1968). A Color View of Planet Earth. Bull. Am. Met. Soc., Vol. 49, No. 2.

14. Violette, la P. E., P. Chabot (1967). A Satellite Photograph of Pacific Ocean Currents. Deep Sea Res., Vol. 14, No. 4.

15. Wernecke, G., W. Sunderlin (1968). The First Color Picture of the Earth Taken from the ATS-III Satellite. Bull. Am. Met. Soc., Vol. 49, No. 2.

Footnotes

[1]Still more interesting were global photographs of the Earth taken from space station Zond-7. They were photographed on color film on August 8, 1969 about 0900 hours Moscow time. The photographic axis was directed toward the Caspian Sea (Pravda, August 29, 1969).

[2]A discussion of the results of the meteorological interpretation of this image can be found in the work of Bugayev et al. (1969).

Illustrations

Fig. 1. Global photomontage of area television images of the Earth's surface received from Tiros-IV. In the photograph the different forms of cloud cover are distinctly marked. However, compatibility of these earth's image is complicated by the mosaic effect of the montage.

Fig. 2. Global image of the Earth taken with a narrow-angle camera from the artificial Earth satellite Molniya-1 (distance of 18,400 km). In it we see the basic cloud structures above Europe, Eastern and Central Siberia, and Southern Asia.

Fig. 3. Global image of Earth taken from artificial Earth satellite ATS-1 (height of 34,880 km). The distribution of the cloud cover and basic cyclone structures above the Pacific Ocean are quite visible. Also apparent is the relationship between the development of the clouds and the warm and cold currents.

Fig. 4. Global photographs of Earth taken from automatic space station Zond-5 from a height of 90,000 km. This gives at a glance an example of an image of the topographical-climatic zonality over Africa and the Atlantic Ocean.

Fig. 5. Interpretation of latitudinal topographical-climatic zonality of Africa from the global photograph taken from automatic space station Zond-5. Legend:

1 sclerophyllous evergreen forests and subtropical scrub;
2 desert steppes and grassy-scrub subtropical (a) and tropical (b) semideserts;
3 tropical deserts;
4 dry savannahs and tropical thorny trees;
5 typical savannahs and tropical thin forest;
6 humid high-grass savannahs and tropical savannah forest;
7 humid tropical equatorial forest.

Fig. 6. An enlarged fragment of a global photograph of the Earth obtained from automatic space station Zond-5. The Central and Western Sahara and the Atlas Mountains. The landscape type, geological formations, and types of macrorelief are seen distinctly. In places oases, wadi valleys, and currents of flying sand and dust are visible.

Fig. 7. Interpretation of landscape types of the Central and Western Sahara from a photograph of the Earth taken from automatic space station Zond-5. Legend:

1 rocky plains,
2 sand massifs,
3 halyophytic-clay depressions and oases,
4 sloping plains,
5 alluvial plains,
6 low-mountain relief,
7 medium-mountain relief,
8 maritime coastal plains.

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TWELFTH SEMI-ANNUAL RESEARCH SUMMARY

DECEMBER, 1969 THROUGH MAY, 1970

School of Electrical Engineering
Purdue University
Lafayette, Indiana 47907

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A. A DIGITAL THERMOMETER FOR FIELD THERMAL MEASUREMENTS

L. F. Silva, B. Robinson

A portable digital thermometer suitable for field thermal measurements has been designed, built, and tested under field conditions. The instrument is battery operated with 4 place digital readout and uses thermistors with compensating circuitry so that linear temperature-voltage conversion is obtained and direct readout is possible. Both surface and depth temperature probes are available. Accuracies of over a range of 0-100°C $\pm$ .2°C are obtainable with 5 second equilibration times. The instrument is mounted in a rugged field case and may be used in unfavorable environments.

REFERENCE

This work supported by USDA Contract #12-14-100-10292(20) and NASA Contract #MGR 15-005-112.

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NPIC/TSG/RED/SRB-005-71
10 February 1971

MEMORANDUM FOR THE RECORD

SUBJECT: ERTS and SKYLAB Meeting

1. On February 2 thru 5, 1971 a meeting was held at the Goddard Space Flight Center of NASA for potential investigators in the ERTS and SKYLAB programs. This memo outlines the proceedings of this meeting.

2. The purpose of the meeting was to provide background information and to answer questions of potential investigators of data supplied by the two programs. Approximately 600 persons attended the ERTS portion of the meeting and about 400 attended the SKYLAB portion. Representatives were present from Federal and state agencies, private industry, academic institutions, and 26 foreign countries.

3. The first Earth Resources Technology Satellite (ERTS-A) is scheduled for launch in March 1972. It will image the entire continental United States every 18 days with return beam vidicons looking at three parts of the visible and near IR spectrum and a multispectral scanner viewing four bands including two in the IR region. Thus seven individual images will be taken of each 100 by 100 nautical mile area. Up to 188 sets of seven images can be taken each day. About 44 sets will be used for U.S. coverage so that 144 remain for imaging other areas of interest. Data will also be gathered from remote, widely distributed ground sensors that can measure temperature, wind velocity, water velocity, etc. ERTS-B will be launched about a year later and will essentially duplicate the feat of ERTS-A except that if both satellites continue to function, complete coverage will occur every 9 days.

4. SKYLAB is an experimental space station designed to expand knowledge of manned earth orbital operations and to accomplish carefully selected scientific, technological, and medical investigations. Of primary interest to earth resources are the five cameras that can simultaneously, or in any combination, image many selected areas of the earth. The S190 Multispectral Photographic Facility obtains multispectral photographs using a six-camera array. The S191 infrared spectrometer images in the visible and infrared spectral regions. The S192 Ten-Band Multispectral Scanner likewise looks at the visible and infrared regions. The S193 Microwave Scatterometer/Altimeter/Radiometer obtains active and passive microwave data. The S194 L-Band Radiometer records radia-

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SUBJECT: ERTS and SKYLAB Meeting

tion in the L-Band range of microwaves. Three different crews of three men each will spend 28, 56, and 56 days in orbit. The astronauts will spend long working days with every minute of their time precisely planned each day. SKYLAB will be launched about mid-1973.

5. The ground resolution of ERTS is at best about 200 feet. In this respect it is a far cry from the quality of material we are accustomed to. However, because the imagery is multispectral and includes various IR frequencies and because of the frequency of coverage, it could provide useful intelligence information. Perhaps of greater value to NPIC is the experience the ERTS program can provide in handling near real time imagery. In one year's time, one of the ERTS satellites can cover about five billion square miles of the earth. Techniques are already being developed to interpret, store, display and manipulate this tremendous volume of imagery. I believe that NPIC and particularly RED should maintain close contact with the program to benefit from the planning that has already gone into the program and from the experience that will acrue. Purdue University has an electronic display to view ERTS imagery and the technology used in this system may be applicable to near real time imagery.

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Maine claim to fame

AUGUSTA, MAINE (UPI) — The Maine State Museum has acquired a picture of the state taken from space-with a little international cooperation.

Research assistant Ronald Kley said the museum wanter the photo for the opening of a new cultural center but was unable to get one from American sources.

The institution asked officials in the Soviet Union, who said they would supply a photo for $20 and a negative for $100.

The museum could not afford that, but the editors of Life magazine bought the photograph from Tass and gave it to the state.

F/I ARGO

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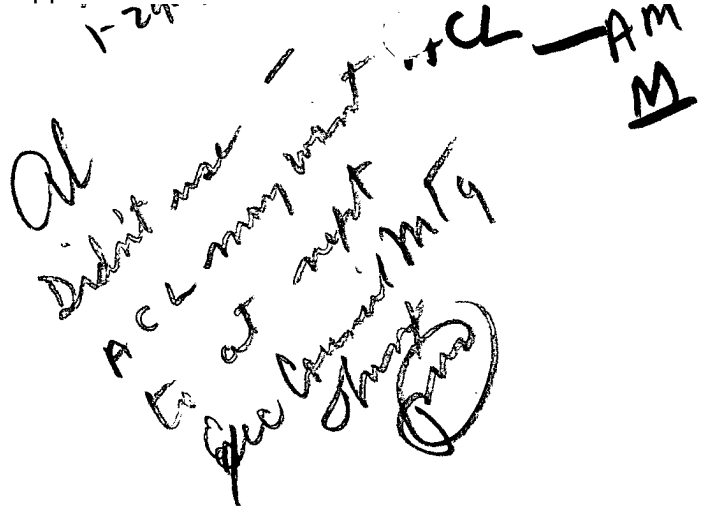

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MEMORANDUM FOR: AE M

Passed this info on to [redacted] who says he has an order in to DCS for a print.

Bill

1/29/71
(DATE)

25X1

FORM NO. 101 REPLACES FORM 10-101 (47)

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ROUTING AND RECORD SHEET

SUBJECT: (Optional) DCS Case 55,819 - Soviet Satellite Photograph of US East Coast

FROM: DCS/Soviet Bloc Division RSW

EXTENSION: 2202

NO.: DCS Case 55,819

DATE: 8 February 1971

25X1

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. NPIC [redacted]	2/10			Attached are one negative copy and one print of the Soviet satellite photograph taken of the East Coast. These are for your retention.
2. PNS	2/10	2/10		
3. ACL	2/10	2/10		
4.				
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25X1 [redacted]

1 to 2

Had wanted to borrow the original DP sent over - so we, at least, could see their stock. But you've got this.

FORM 3-62 610 USE PREVIOUS EDITIONS ☐ SECRET ☐ CONFIDENTIAL ☐ INTERNAL USE ONLY ☑ UNCLASSIFIED

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DCS Case: 55819

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ФОТОМОНТАЖ РАЙОНА ШТАТА МЭН (США), СФОТОГРАФИРОВАННЫЙ СОВЕТСКИМ МЕТЕОРОЛОГИЧЕСКИМ ИСКУССТВЕННЫМ СПУТНИКОМ ЗЕМЛИ

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MEMORANDUM FOR:

(DATE)

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1 AUG 54 WHICH MAY BE USED. (47)

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			19 Jan 71

TO		INITIALS	DATE
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EXEC/DIRECTOR			
SPECIAL ASST	1.	M	1/20
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CH/DIAXX-4			
CH/DIAAP-9			
CH/SPAD			

REMARKS

FYI

File DCI

2/8/71
Bill was will get. Bill get to Library. 2/8/71 Follow up

WALLY L.
⇒ would like a good copy of the p. 81 Oct. Scorecard type sheet for my records.
Can you arrange?
acl.

Dan P
2/5 C.
$4
P. 81 '70
2/9/70

FORM 30 (7 70) OBSOLETE PREVIOUS EDITIONS

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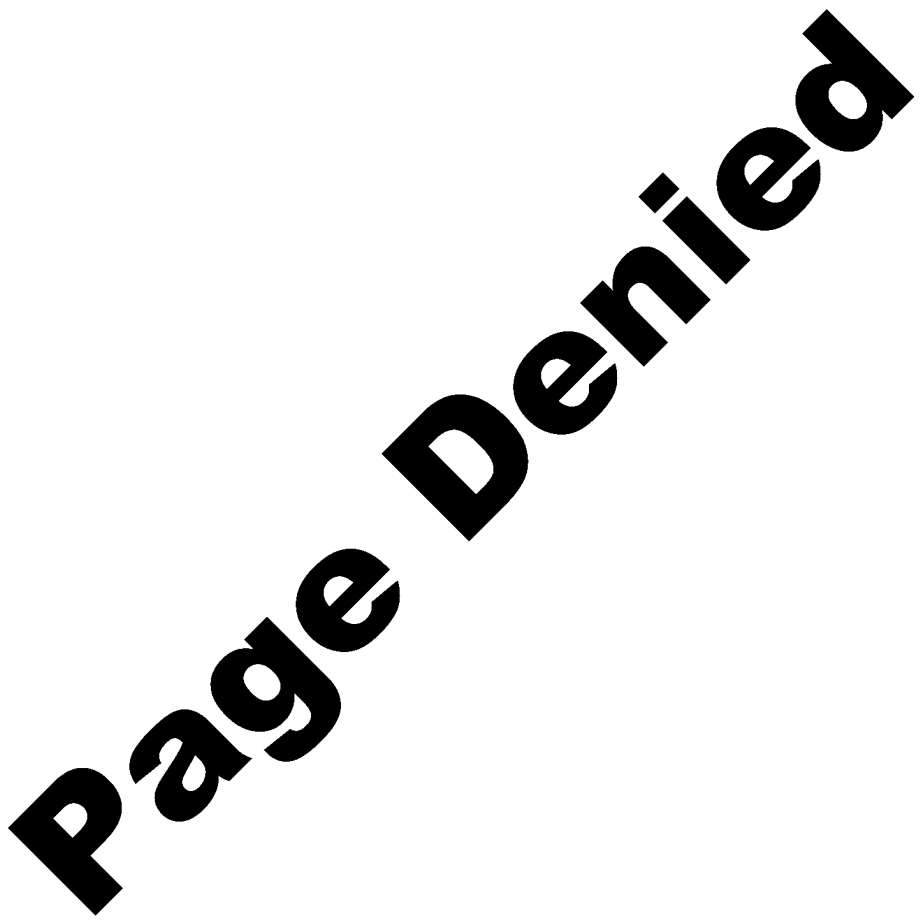

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[redacted] 25X1

19 January 1971

Copy 1

MEMORANDUM FOR: THE RECORD

SUBJECT : ARGO Meeting, 10:00 a.m. to 1:00 p.m., Room 208, EOB, January 13, 1971

1. [redacted] Chairman, opened the meeting with an agenda item covering the attachment (proposed declassification of KH-4 DISIC [redacted] to meet civil requirements). The attachment is self-explanatory and is not a distributed paper (no mention should be made of it as all copies except this one were collected). Considerable discussion occurred regarding accuracy of statements on requirements for better-than-ERTS system, resolution needed, timeliness, impact of budgets on ability to use electronic information versus conversion of ERTS to imagery, impact on COMIREX requirements, etc. Otto Guthe did an excellent job guiding the group back to a responsible beaurocratic approach. The OST approach would have taken the recommendations (after revision and staffing) to the NSC staff, 40 committee and OMB. Otto succeeded in getting the subject directed toward the DCI Representative (Inlow), COMIREX (SDWG and MCWG), USIB, EXCOM and the NSAM 156 Committee. This is to be done after it is determined that the need exists and is matched against the systems proposed for use. This will require a small working group. 25X1 25X1 25X1

2. The next item dealt with declassification of Red Dot indexes and imagery - ditto other camera systems. A request will be made to Inlow as DCI Rep to be staffed out by [redacted] SDWG and Security. It is expected that this can be done with film-cropping, enlarging/reducing and referring only to high altitude photography - not to U-2. A problem brought up by [redacted] (Head - NSA Earth Resources) concerned his inability to tell requesters of funds for atmospheric studies (degradation of imagery due to altitude) that the job's been done. [redacted] (NPIC) and [redacted] (OSP) will meet with [redacted] to determine which specific past analysis is involved and, when identified, [redacted] will request its declassification through proper channels. This was followed by similar discussion with DIA on possible declassification of the AN/APQ93 radar. On radar it seemed that the breakpoint for classification is (a) 30' resolution minimum with planimetric and (b) exclusive of stereo using interferometer technique. There are techniques to use the AN/APQ93 at less efficient levels to avoid classification. DIA has responsibility for this one. 25X1 25X1 25X1 25X1 25X1

3. The NOAA (formerly ESSA) briefing in snow fields was rather hasty regarding use of U-2 imagery to determine flood levels. (Briefers were away and the NOAA ARGO member had just seen their report before the meeting). Two points I recall covered (a) the need for color imagery to distinguish between some clouds and snow conflicts and (b) an example of savings. The latter case involved a decision not to release water from a California

GROUP 1
Excluded from automatic downgrading and declassification

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dam/reservoir to make room for flood control storage in view of an originally estimated heavy flood back-up from snowfields. Photography had given a different and lesser estimate which turned out to be accurate, saving an estimated $5 to $7 million in damage from deliberate flooding plus loss of water.

4. [redacted] (NRO) reported four Q28/6" Army systems are standing at Forbes AFB and are available for civil requirements if the civil requester has the funds to pay for the use. USGS-Reston has been receiving excellent film from these systems - taken for training purposes. 25X1

[redacted] 25X1

ARGO Representative
NPIC

Distribution:
Copy 1 - ODIR & ARGO File
2 - NPIC/PPBS
3 - NPIC/TSG [redacted] 25X1
4 - NPIC/IEG
5 - TSG [redacted] 25X1

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Background

The National Academy of Science sponsored a summer study at Woods Hole, Massachusetts, during the Summer of 1967 to establish the requirements for remote sensing for civil applications. The attached chart, which was derived from that study, shows that the civil applications to which imagery is applicable all require 100 foot ground resolution or better. The only exception to this is for atmospheric studies. NASA currently estimates that the best ground resolution to be derived from ERTS A&B is 300 to 500 feet. Therefore, it would appear that other means for meeting the earth resources requirements should be investigated.

1/13/71
This draft was distributed & recalled during ARGO meeting today. It will be changed & redistributed. No copies (except this one) are out. DIs do not refer to this copy — nor make a copy.
WRL

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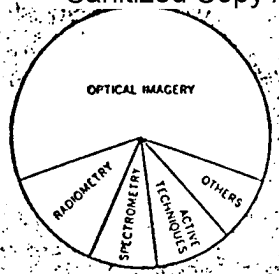
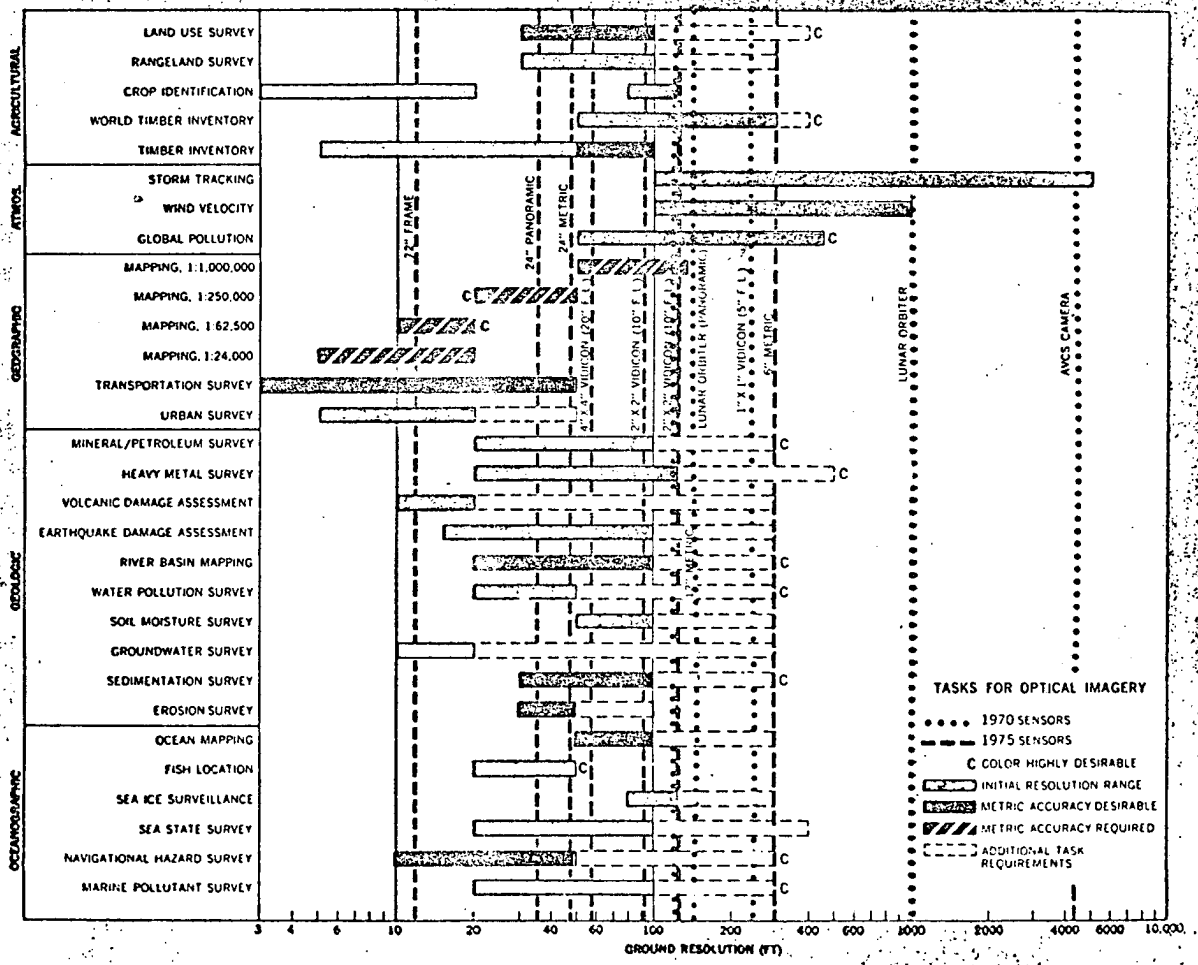


	AGRICULTURAL									GEOGRAPHIC						GEOLOGIC						HYDROLOGIC					OCEANOGRAPHIC			
	VEGETATION DENSITY	GRASS/BRUSH/TIMBERLAND INTERFACES	PLANT SPECIES & VIGOR	SOIL SERIES, TEMPERATURE & MOISTURE	IRRIGATION WATER	FIRE DETECTION	LAND USE	TRANSPORTATION & LINKAGES	SETTLEMENT & POPULATION MOVEMENTS	RESOURCES UTILIZATION	CLIMATIC CONDITIONS	TOPOGRAPHICAL MAPPING & GEOMORPHOLOGY	COMPOSITION	STRUCTURE	STRATIGRAPHY - SEDIMENTATION	MINERAL DEPOSITS	ENGINEERING	CRUSTAL MANTLE STUDIES	TRANSPIRATION	RAIN DISTRIBUTION & INFILTRATION	GROUND WATER DISCHARGE	WATER POLLUTION	SNOW SURVEYING & GLACIOLOGY	EFFLUENTS OF MAJOR RIVERS	THERMAL CONDITIONS	SEA SURFACE ROUGHNESS	SHOALS & COASTAL MAPPING	BIOLOGICAL PHENOMENA	ICE SURVEILLANCE	SUBSURFACE STRUCTURE
METRIC CAMERA	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●			●	●	●	●	●	●	●		
PANORAMIC CAMERA	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●		
MULTISPECTRAL TRACKING TELESCOPE	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●		●	●	●	●	●		●	●	●	●		
MULTIBAND SYNOPTIC CAMERA	●	●	●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
HIGH RESOLUTION TV	●	●					●	●	●		●		●						●	●	●	●				●	●	●		
RADAR IMAGER	●	●		●	●	●	●	●		●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	●		
RADAR ALTIMETER/SCATTEROMETER															●	●			●			●			●			●		
MICROWAVE IMAGER				●	●		●					●	●	●			●		●	●	●	●	●	●	●	●		●		
MICROWAVE RADIOMETER				●	●	●					●						●	●	●		●	●	●	●	●	●		●		
RADIO FREQUENCY REFLECTIVITY																	●	●					●	●			●	●		
LASER ALTIMETER/SCATTEROMETER										●		●	●	●	●	●						●	●		●	●		●		
WIDE RANGE SPECTRAL SCANNER (0.32–14.0μ)	●	●	●	●	●	●	●	●				●	●	●	●	●	●	●	●	●	●	●	●		●	●	●			
INFRARED RADIOMETER/SPECTROMETER	●		●	●		●	●	●				●		●	●	●	●	●			●	●	●	●		●	●	●		
ABSORPTION SPECTROSCOPY												●			●												●			
ULTRAVIOLET SPECTROMETER IMAGER												●	●	●	●															
MAGNETOMETER									●						●		●								●				●	
GRAVITY GRADIOMETER															●		●							●	●	●			●	
EARTH BASED SENSORS*				●	●	●	●	●	●		●	●		●			●	●	●	●	●	●	●	●	●	●	●	●	●	●

*May include a number of fixed and mobile instruments, such as buoys, seismographs, stream gauges, and so forth, placed on or near the



As shown in the matrix, a wide variety of earth-resource sensors have multiple applications, over half of which are in the visible spectrum. The lower chart relates resolution requirements (from 500-nm orbit) to present and future optical devices.

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Through the ARGO Steering Committee and other mechanisms, such as the NASA/DOD Space Activities Coordinating Committee, Federal civil agencies and NASA are familiar with the photographic capabilities of the NRP. The KH-4 system and the U-2 and SR-71 aircraft programs have been used to meet some mapping and disaster applications of the Departments of the Interior and Agriculture and the Office of Emergency Preparedness. As a result of these efforts and other studies, some of which have been sponsored by the intelligence community, it appeared that the KH-4 system could meet the requirements for ERTS C and D. The NRO offered NASA the option to purchase two additional KH-4 systems in January-February 1970; however, OMB declined to grant NASA the funds to do this, based on the premise that the world is already photographed by this system, therefore additional systems are not needed and one has only to downgrade the classification and release the photography of the areas desired. However, the current 0.1 milliradian resolution restrictions of NSAM 156 prohibit release of this photography. has proposed to USIB a revision of NSAM 156 to 20 meter ground resolution now and 5 meter ground resolution by 1975 which would make the DISIC film available now and the 24-inch panoramic film available in 1975.

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The user agencies have applied aerial photography to their problems for a considerable period of time; they are equipped and

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have the expertise for these applications. They do not have the expertise nor the equipment to directly apply the electronic readout data to their problems in most cases. This will require that the electronic readout data will have to be converted to imagery before it can be used.

In summary, the current situation facing the Earth Resources Program is:

a. The ERTS A satellite will not meet requirements in resolution for most of the proposed applications.

b. The user agencies are being organized and have requested funds to apply space data to problem areas in 1972.

c. The users have worked with aerial photography and have the expertise to apply this type of data to their operations. They have little experience and are not presently equipped to apply electronic readout data directly to many of their applications.

d. The NRP satellite frame camera systems and the aircraft camera systems can meet many of the civil requirements.

e. NSAM 156 would have to be modified along the lines proposed by [redacted] to permit the application of a portion of the NRP camera systems to the civil agencies requirements.

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The NRP camera systems that are best suited to the immediate application of earth resources problems are the frame cameras on the KH-4 systems.

These cameras are primarily used for vehicle altitude determination and for defense mapping, charting and geodesy. They serve also the purpose of providing some geometric calibration to the panoramic and strip camera systems which are of prime interest to the intelligence community.

Specifically, the NRP cameras which appear to have the characteristics to meet the near-term earth resources requirements are:

a. The KH-4 DISIC 3-inch focal-length, frame camera, which has a 4.5-inch by 4.5-inch format and covers an area 126 by 126 nm per frame at a ground resolution of 120 feet. NASA is procuring two of these cameras for use in Apollo 15 and 16 lunar mapping programs. The ITEK 24-inch optical bar panoramic cameras will also be flown on Apollo 15 and 16.

c. ITEK 24-inch, optical bar, panoramic camera, which has a 4-inch by 2.5 foot format. This camera is designed for high-altitude aircraft.

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d. ITEK 13-inch panoramic camera, which has a 70 mm by 2.5 foot format.

These cameras are capable of providing coverage of large areas with black and white, color photography. The color capability of the DISIC and 12-inch frame cameras is limited, due to lens speed and the filters on these cameras. It is possible, however, with some modification to acquire color photography with these cameras.

The alternatives for using NRP cameras and systems to fulfill earth resources needs are limited use of NRP satellite camera systems and NRP aircraft systems. For NRP satellite systems, assuming that the USIB and the 40 Committee agree to the NSAM 156 changes proposed by the Director of the NRO, then it would be possible to test the NASA lunar frame camera in earth orbit. One method for doing this could be the announcement that the NASA lunar frame camera, which in reality is the KH-4 DISIC, would be tested in earth orbit as a "piggyback" on a DOD program starting this spring. Since the DISIC normally obtains photographic coverage of the United States for engineering purposes, the cost to the NRP of doing this would be the cost of processing an extra copy of this coverage.

. Therefore, it too could be presented as a NASA piggyback payload on a DOD program. This would require at least a modification to increase its film load if DOD and earth resources requirements were to be met without conflicts on

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scheduling the coverage. The cost of this modification is a one-time cost of $1.5M. The lens should be modified if color photography is desired. The cost of this would be _____ for development and a recurring increase in cost of _____ for each camera equipped for color photography.

Excess NRP U-2C aircraft are an additional means of supporting the earth resources applications. NASA is currently negotiating for two U-2C aircraft to carry experimental payloads. If the same type of arrangement could be made, say between the Department of the Interior and DOD, then a program could be started to acquire high-altitude photography of the United States on a regular basis. NRP training flights have been used for this purpose in the past. However, it would appear that this effort would be more efficient if it were managed and funded by the civil users. It is estimated that operational costs of the U-2 are approximately $200 an hour. The modification to put a stable-mount for cartographic frame cameras in the U-2 is estimated at $1M per aircraft.

It is recommended that consideration be given to the following:

a. Declassification of the KH-4 DISIC [redacted] 25X1

cameras with appropriate cover, i.e., NASA/DOD piggyback.

[redacted] 25X1

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b. These cameras be credited as "piggyback" payloads with NASA/user agencies to pay for any required modification.

c. An announcement that the NASA lunar frame camera (DISIC) will be tested in earth orbit on a DOD program this spring.

d. Two or three excess U-2C aircraft be turned over to the Department of the Interior for use in the United States. (Department of the Interior would have to fund this operation.)

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Thermal indicators are used for getting information on water, plankton, the earth and sea near the shoreline; for studying volcanic formations; and for studying thermal zones; for discovering forest fires; and for determining their boundaries.

3. (C) Development of the use of microwave methods make it possible to determine all the conditions of the atmosphere and also to discover icebergs, get an idea of ice conditions and surface perturbations. Cosmos 243 carried out experiments of this type with promising results. With radio the most difficult studies can be carried out, such as studies of ice reconnaisance, river systems, fluvial systems, length of currents, gradients, and values. In geological research, radio permits the researcher to obtain outlines of geological structures and the situation of the bedrock. In agriculture, it permits locating the boundaries of the fields, studying the crops, and the classification of arable land. Radar surveys make it possible, without any obstacles, to study radio emission through the clouds and the surface of the soil.

4. (C) To demonstrate some concrete results of the methods he had been discussing he showed photographs taken from some of the USSR satellites. He showed pictures of sea perturbations and storms. ZOND 5 pictures showed N. Africa under a storm. Other ZOND 5 pictures had been made into a map of N. Africa demonstrating clearly its zonal characteristics and geomorphological characteristics. He showed a satellite picture and gave an analysis of the offshore conditions which it portrayed, pollution lines, etc. He also showed a geobotanical map made by TV transmission from ZOND 5, using "non-stop transmissions" (his term). He said he was particularly interested in how the atmosphere distorts image spectrophotometry. SOYUZ 6-7-8 carried out a complex program simultaneously with two aircraft flying at different altitudes and with an earth expedition all in the same location doing the same experiments. KONDRAYEV said that the lesson the USSR learned from this program is that the images obtained on the long wave part of the spectrum do not always give the correct information. But, by combining satellite, aircraft, and earth based data taken simultaneously of the same location, the data is good. SOYUZ 5 made observations on the clarity of the twilight horizon and got information on atmospheric pollution. KONDRAYTEV made the point that human emotions have a decided effect on space observations from manned satellites. He said that TITOV's highly emotional descriptions were compared with the subjective pictures obtained of the twilight horizon photographed in space.

5. (C) The following points seemed significant to Source:

a. That the method now being used in the USSR is one of combining the talents of people in many disciplines to interpret the data from satellites. He also emphasized using these combined talents to determine the most useful ways of employing the space information and how to enhance its effectiveness.

b. Conversely, KONDRAYTEV did not suggest an international pooling of space information. His emphasis was on pooling talents in his country.

c. He seemed to place considerable emphasis on the study of ocean resources through satellite research.

d. He mentioned the success of LUNA 16 in studying space automatically.

e. He mentioned manned space patrol of the whole globe. Did not mention an international space station however. This was the subject of two sessions of the Congress, Third International Orbital Laboratory Symposium on Monday afternoon and Tuesday morning. Source did not attend these sessions.

f. He emphasized the need for both manned and unmanned satellites in orbital research.

g. He mentioned multichannel transmission for instantaneously obtaining data on space reconnaissance.

h. He said that COSMOS 243 made microwave experiments to determine the

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CONTINUATION SHEET | C O N F I D E N T I A L | REPORT NO. [illegible] PAGE [illegible] OF [illegible] PAGES ORIGINATOR [illegible]

(Classification and Control Markings)

condition of the atmosphere, and to study icing conditions on earth.

i. KONDRAYTEV is particularly interested in spectrophotometry.

PREPARING OFFICER'S COMMENTS: The paper "Man's Environment from Space", by K. Ya. KOND.AYTEV , discussed in this report, is on file and may be obtained by qualified consumers from FTD (NIIR), WPAFB, Ohio 45433, with reference to IR 1 570 C017 71.

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DATE: 11 Feb 71

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4	RD		TSD
		IAS/DDI	
	MSD		DIR
IEG			DEP DIR
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	EXEC		PB
	PBES		SB
	OS		MD
	WGD		MSD
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ACT 2/16

WL *

WALLY — Very interested in this and below referenced document to be seen and added to our classified "peaceful" uses file.

ACT 2/16/71

REMARKS: If you are interested in the referenced paper "Man's Environment from Space" Please let us know, and we will try to obtain a copy.

IP FM 165 (8/68)

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DEPARTMENT OF DEFENSE INTELLIGENCE INFORMATION REPORT

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(Classification and Control Markings)

This report contains unprocessed information. Plans and/or policies should not be evolved or modified solely on the basis of this report.

1. COUNTRY: USSR

2. SUBJECT: The application of space technology to the study of man's environment (U)

3. ISC NUMBER:

4. DATE OF INFORMATION: October 1970

5. PLACE AND DATE OF ACQ: Konstanz, FRG December 1970

6. EVALUATION: SOURCE B INFORMATION 2

7. SOURCE: SD-710

8. REPORT NUMBER: 1 570 0017 71 FTD PN 6659-16

9. DATE OF REPORT: 18 January 1971

10. NO. OF PAGES: 3

11. REFERENCES: FTD 6635N, ASD 1-70-33, IR 1 561 0119 70, DIRM 4A3c, 4A3d, 4A3b(7)

12. ORIGINATOR: ASD/FTD (FAOH), WPAFB, Ohio

13. PREPARED BY:

14. APPROVING AUTH

RECD COS 25 JAN 1971

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15. SUMMARY:

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(C) Source, a U.S. citizen, attended the 21st IAF Congress in KONSTANZ (4740N 0910E), FRG, 4-10 October, 1970. This report contains general comments of the Source concerning an invited Soviet presentation to the Congress by K. Ya. KONDRATYEV, Head of Department of Atmospheric Physics, University of Leningrad, LENINGRAD (5955N 3020E), USSR. This presentation outlines the prospects of using application satellites (meteorological, etc.) in studying the earth's material resources and natural phenomena.

79

1. (C) KONDRATYEV began his presentation by discussing background information such as problem areas and methods of obtaining data. One problem is interpreting the images from space spectrophotometry of the earth. He emphasized that, since the interpretation of the material from space is arbitrary, the most fruitful results come from a comprehensive, overall study of the spectrographs. Multichannel transmission is an example of instantaneously obtaining data. The aim of space surveys are varied depending on the research mission.

2. (C) The most widespread methods of obtaining information are by radio, TV, and photographic infrared. Photographs covering large portions of the surface provide a great deal of information. Recordings in the infrared portion of the thermographic and thermovisual spectrum give information on the dark side of the planet.

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16. DISTRIBUTION BY ORIGINATOR:

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17. DOWNGRADING DATA:

DOWNGRADED AT 12 YEAR INTERVALS; NOT AUTOMATICALLY DECLASSIFIED. DOD DIR 5200.10

18. ATTACHMENT DATA:

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D FORM 1 SEP 62 1396

REPLACES DA FORM 1048, 1 AUG 60. OPNAV FORM 3820 (Rev 10-61) AF FORM 0752 SUPER, WHICH MAY BE

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Thermal indicators are used for getting information on water, plankton, the earth and sea near the shoreline; for studying volcanic formations; and for studying the thermal zones; for discovering forest fires; and for determining their boundaries.

3. (C) Development of the use of microwave methods make it possible to determine all the conditions of the atmosphere and also to discover icebergs, get an idea of ice conditions and surface perturbations. Cosmos 243 carried out experiments of this type with promising results. With radio the most difficult studies can be carried out, such as studies of ice reconnaisance, river systems, fluvial systems, length of currents, gradients, and values. In geological research, radio permits the researcher to obtain outlines of geological structures and the situation of the bedrock. In agriculture, it permits locating the boundaries of the fields, studying the crops, and the classification of arable land. Radar surveys make it possible, without any obstacles, to study radio emission through the clouds and the surface of the soil.

4. (C) To demonstrate some concrete results of the methods he had been discussing, he showed photographs taken from some of the USSR satellites. He showed pictures of sea perturbations and storms. ZOND 5 pictures showed N. Africa under a storm. Other ZOND 5 pictures had been made into a map of N. Africa demonstrating clearly its zonal characteristics and geomorphological characteristics. He showed a satellite picture and gave an analysis of the offshore conditions which it portrayed, pollution lines, etc. He also showed a geobotanical map made by TV transmission from ZOND 5, using "non-stop transmissions" (his term). He said he was particularly interested in how the atmosphere distorts image spectrophotometry. SOYUZ 6-7-8 carried out a complex program simultaneously with two aircraft flying at different altitudes and with an earth expedition all in the same location doing the same experiments. KONDRAYTEV said that the lesson the USSR learned from this program is that the images obtained on the long wave part of the spectrum do not always give the correct information. But, by combining satellite, aircraft, and earth based data taken simultaneously of the same location, the data is good. SOYUZ 5 made observations on the clarity of the twilight horizon and got information on atmospheric pollution. KONDRAYTEV made the point that human emotions have a decided effect on space observations from manned satellites. He said that TITOV's highly emotional descriptions were compared with the subjective pictures obtained of the twilight horizon photographed in space.

5. (C) The following points seemed significant to Source:

a. That the method now being used in the USSR is one of combining the talents of people in many disciplines to interpret the data from satellites. He also emphasized using these combined talents to determine the most useful ways of employing the space information and how to enhance its effectiveness.

b. Conversely, KONDRAYTEV did not suggest an international pooling of space information. His emphasis was on pooling talents in his country.

c. He seemed to place considerable emphasis on the study of ocean resources through satellite research.

d. He mentioned the success of LUNA 16 in studying space automatically.

e. He mentioned manned space patro[illegible] of the whole globe. Did not mention an international space statio[illegible], however. [illegible]is was the subject of two sessions of the Congress, Third International Orbital Laboratory Symposium on Monday afternoon and Tuesday morning. Source did not attend these sessions.

f. He emphasized the need for both manned and unmanned satellites in orbital research.

g. He mentioned multichannel transmission for instantaneously obtaining data on space reconnaisance.

h. He said that COSMOS 243 made microwave experiments to determine the

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DEPARTMENT OF DEFENSE INTELLIGENCE INFORMATION REPORT

CONTINUATION SHEET	CONFIDENTIAL (Classification and Control Markings)	REPORT NO. 1 570 0017 71 PAGE 3 OF 3 PAGES ORIGINATOR ASD/FTD, WPAFB, Ohio

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condition of the atmosphere, and to study icing conditions on earth.

i. KONDRAYTEV is particularly interested in spectrophotometry.

PREPARING OFFICER'S COMMENTS: The paper "Man's Environment from Space", by K. Ya. KONDRAYTEV , discussed in this report, is on file and may be obtained by qualified consumers from FTD (NIIR), WPAFB, Ohio 45433, with reference to IR 1 570 0017 71.

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DD FORM 1 SEP 62 1396c

REPLACES AF FORM 112a, JUL 61 WHICH MAY BE USED UNTIL 1 JAN 63.

* GPO : 1964 O—738-260

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CENTER ROUTING SLIP

FROM	DATE
W.I.R.L.	1/18/71

TO		INITIALS	DATE	REMARKS
DIRECTOR	4	GCL	1/22	
DEP/DIRECTOR	3		1-19	
EXEC/DIRECTOR	2		1/19	
SPECIAL ASST	1	M	1/19	
ASST TO DIR				
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PERSONNEL				
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A1 - Ris was unavoidably delayed. Wally

Rich
Pls file in RG-0

IP FM 30 (12-69) - OBSOLETE PREVIOUS EDITIONS

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Brief Highlights
COMIREX Meeting
Auditorium Bldg. 213
1000 Thursday, 7 Jan. 71

Briefings: [redacted] NRO, briefed on the [redacted] project. Much information has already been available in NPIC and to its [redacted] project officers, but some points in [redacted] briefing: The question of the difference between 10' resolution (radar) and 10' resolution (photo) was discussed and (at least to me - WRL) needs further clarification -- in order that one's expectations from radar imagery will not be based, insofar as resolution characteristics are concerned, upon experience with photo imagery resolution which provides more information. - Missions will be flown at night. - Care will be taken to experiment with "unknown" target characteristics, one of the reasons for using foreign targets. - Oblique will be primarily 6.7 nm to 20 nm coverage from radar at 30° to 60°. - Range 5 to 65 nm, either side. - Swath 5 nm. - Recording capacity 2500 nm. - Location accuracy 3000' (not too clear on this - WRL). - System uses antenna feeding cathode ray tube display which is recorded on film - then ground correlations producing film for delivery to NPIC. February/March '71 - domestic tests still planned - with Cuban missions for April (political permission seems likely). - Cuban missions are expected to be 1 every 3 days for 45 days maximum. - Later satellite application is expected at 218 nm altitude at 10' (radar) resolution with no sun angle or weather interference except severe thunderstorms.

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Minutes-114: Approved

Minutes-115: Publish week of 11th with comments due by Friday, 15th to Executive Secretary.

Satellite Schedule: Copy attached.

EXRAND Objectives: Approved. EXRAND plans to update every year.

Crisis Task Team: In [redacted] absence [redacted] gave status report. (Believe addresses are familiar with status - WRL) - [redacted] referred to parallel community effort on indications/warning lists for Near Real Time.

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Obliquity: [redacted] obliquity presentation to be given at next COMIREX meeting on 21 January 1971.

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[redacted]

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Indochina Requirement: Will be redrafted and placed on next COMIREX agenda for action. Question concerns frequency of ~~more~~ coverage - the necessity, reported by Inlow, that policy makers need to know, for example, that "all's quiet" can be verified. Change would be from quarterly coverage of built-up areas and semiannual for other areas to monthly (built-up) and quarterly (others).

OPIC-A: DIA [redacted] reported that the 67th Recce Tech will be deactivated. Present plans call for OPIC-A to be transferred to the 548th in Hawaii. The 67th will carry OPIC-A until transfer can be effected to Hawaii. Approval will be requested of COMIREX [redacted] queried - before or after the fact?). [redacted] requested the AF representative to report at next meeting on the processing of materials (Giant Scale and others) and transmission to Washington (There had been an estimate of one day's delay).

EXSUBCOM: [redacted] reported that he has or is planning a paper for publication on 1st and 2nd phase requirements for exploitation in North Korea. It is based upon intelligence problems of the community - he mentioned CCPC, inter alia. Schadegg commented that he hoped it would serve also for collection requirements.

[redacted] also reported that 21 people were scheduled for a trip to EK on Sunday, 10 January 1971 for a [redacted] film planning session.

After COMIREX: [redacted] and WRL met with [redacted] in IEG. Dino presented feedback reporting and Inlow also received an IIS demonstration. It was agreed to return to IEG after next COMIREX for further discussions/briefings probably getting into IEG's future substantive reporting and requirements.

WRL

Attachment:
January Satellite Operations Schedule

[redacted]

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CENTER ROUTING SLIP

FROM				DATE
DCS				11 JAN 1971
TO		INITIALS	DATE	REMARKS
DIRECTOR	4		1/12/71	FYI
DEP/DIRECTOR	3		1/11	
EXEC/DIRECTOR	2		1/11	
SPECIAL ASST	1	M	1/11	
ASST TO DIR	5	WLG	1/17	
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ROUTING AND RECORD SHEET

SUBJECT: (Optional) Space Research, Developments, and Plans Revealed at the XXI International Astronautical Congress, 4-10 October 1970, Constance (USSR)

FROM: DCS/Soviet Bloc Division [redacted] bd

EXTENSION [redacted]

NO. DCS Case: 54,251

DATE 7 January 1971

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TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. Director, NPIC Attn: Art Lundahl	1/11/71		M	Attached is advance copy of report 00-B-321/37801-70 for your information and retention. 25X1
2.		1/12	aa	We thought you might be interested in this report, particularly Kondratyev's remarks in Paragraph 13.
3.				
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5.				[redacted] 25X1
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GROUP 1 Excluded from automatic downgrading and declassification

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DIRECTORATE OF INTELLIGENCE

C-O-N-F-I-D-E-N-T-I-A-L

COUNTRY	USSR	REPORT NO.	25X1
SUBJECT	Space Research, Developments, and Plans Revealed at the XXI International Astronautical Congress, 4-10 October 1970, Constance	DATE DISTR.	12 JAN 71
		NO. PAGES	4
		REFERENCES	DCS Case 54251 C-DSO-55562
DATE OF INFO.	Oct 70 and earlier		
PLACE & DATE ACQ. BY SOURCE	--: Fall 1970		

THIS IS UNEVALUATED INFORMATION

SOURCE US national and eminent space research scientist.

1. The data below was extracted verbatim from a letter by a highly reliable and professionally competent colleague who attended the XXI International Astronautical Congress held in Constance, Germany during 4-10 October 1970:

2. The following information and conclusions resulted from considerable personal contact with Dr. Oleg Gazenko, Cosmonaut Dr. Boris Yegorov, Cosmonaut Andrian Nikolayev, Cosmonaut Vitali Sevastyanov, and a Mr. Yu V Zonov, who gave his address as the Institute of Space Research, Moscow, and also from short conversations with K. Y. Kondratyev, Dr. V. V. Portugalov, Dr. O. P. Vasilyev, and a few other Soviet delegates.

3. There seems no doubt that Dr. Gazenko was head of the Soviet delegation, a severe departure from former times when Professor Sedov was head of the delegation. The latter has many ties with the International Astronautical Federation and the International Academy of Astronautics, and I could find no logical reason for his absence. I was told only that he had used up his travel time elsewhere. Several of the Soviet delegation took pride in recognizing Dr. Gazenko as head of their delegation. Cosmonaut Yegorov referred to him as the chief. At a very nice luncheon buffet held by the Soviet delegation, Dr. Gazenko stood first in the reception greeting line and Mr. Zonov was second.

4. I do not know who Mr. Zonov is, and I do not recall having seen him before. He is a personable individual, about five feet, eleven inches tall, in his early or mid-forty's, has the bearing of one trained in diplomacy, speaks English perfectly in the US fashion and appears completely assured of his action. He seemed to be consulted regularly by other members of the Soviet delegation including the cosmonauts. It is most probable that he was the security man for the Soviet group.

5. It was obvious from the beginning of the Constance meeting that there had been a very large breakthrough in Soviet cooperation and friendliness and sudden interest in space rescue experienced during and following the recent COSPAR meeting.

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6. Space rescue seemed to be a major interest of the Soviet delegation, several of whom attended that symposium. Dr. Yegorov and Dr. Gazenko attended the entire meeting of the Space Rescue Studies Committee and were complimented on the recent nomination of the four Soviet scientists to the Space Rescue Studies Committee. The Soviets nominated and accepted were Professor V. V. Utkin, Professor N. A. Lobanov, Dr. S. G. Svinnikov, and Dr. V. A. Senushkin. Several members of the Soviet delegation were asked who these men were and what their disciplines were. Their answers were all the same, that they did not personally know them but believed them to be engineers.

7. Shortly after the meeting started there began to be considerable speculation throughout the entire attendance concerning a Soviet and US 'get together' for a cooperative effort in making it possible to dock Soviet space vehicles with US space vehicles for various purposes including space rescue. The US delegates were not talking about it, because practically none of them knew about it except the ones involved, and the few US Space Rescue Committee members who were partially "clued-in" after their arrival in Constance felt that since arrangements for interchange of US and Soviet personnel for the initiation of talks apparently were not complete, they preferred not to jump the gun or in any way further the speculation. The newspaper and other reporters, however, were beginning to entwine the four Soviet Space Rescue Committee nominees with the speculative 'get together' of US and Soviet engineers on docking. Further, the Soviet delegates also seemed to be talking openly about the cooperative effort. Zonov reportedly came to the Chairman (US) of the Space Rescue Committee and said he was surprised that the US Chairman had not announced the coming cooperation between the US and Soviet engineers on docking. The US Chairman reportedly replied he did not know much about it and that it apparently was not his place to go beyond the statement he had made in his "Introduction to the Space Rescue Symposium" in which he had announced the four new Soviet members for the Space Rescue Studies Committee and welcomed their participation. The newspaper media (and apparently some of the Soviets) continued to tie the two together and a great deal of confusion resulted. It would have been well (particularly insofar as the thirteen-nation membership of the Space Rescue Studies Committee was concerned) if someone in a proper position would have formally announced the coming meeting of NASA and Soviet representatives as it would have decreased confusion and speculation among the delegates as well as the press.

8. One of the highlights of the meeting was the Soviet showing of the movie taken during the Soyuz 9 flight. It was narrated by Cosmonauts Nikolayev and Sevastyanov and shown at a downtown movie theatre. The movie was excellent. It was in color and the close-ups were without distortion thus indicating the camera must have been some distance away. Of particular interest was the electric heater in which the Soviet space foods in the toothpaste-like containers were heated. Also of special interest was the harness-like arrangement of the body sensors which they seemed to be able to remove without any difficulty. The shaving process was also shown and in general, the cosmonauts seemed to be living in comfort and taking their exercise without difficulty.

9. The Soviets talked considerably about the difficulty the cosmonauts had after their return to earth and the earth's gravitational field. The question which they did not answer satisfactorily, however, was how much flying time the cosmonauts had had and how well they had kept up their flying conditioning in aircraft.

10. The cabin pressure in Soyuz 9 varied (apparently by control) from 732 to 890 mm. Hg. Oxygen varied from 152 to 185 mm. Hg., and CO_2 from 1.3 to 10.7 mm. Hg. The temperature varied from 17 to 28 degrees C.

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Radiation was .35 rad for one cosmonaut and .4 rad for the other. The cosmonauts were given vitamins and had about two liters of water available per day, but they did not drink their entire ration of water allotted for that purpose. Their pulse rates returned to normal soon after the orbit was stabilized, but after 10 days in flight there was some increase in both their pulse rates. After landing, their heart rates were 120 beats per minute. Their faces were red and puffy with sensations of head fullness after orbit was established but soon returned to normal. After they landed, they were both tired and found it difficult to stand erect. All the Soviets seemed to agree that the long period of weightlessness was the cause of the latter difficulty. Incidentally, one of the Soviet bioastronautic scientists clarified the statement about the CO_2 concentration by mentioning that it actually varied from 1.7 to 5.7 mm. Hg. and that it only went up to 10 mm. Hg. during exercise. He also added that when the filters or sieves were changed, the CO_2 went up to higher levels but for only very short periods of time. The cosmonauts also weighed and there was some reduction in their leg circumference following the flight; Nikolayev lost 2.7 kilos and Sevastyanov lost 4-plus kilos. The cosmonauts themselves also mentioned that they could see stars during the flight by arranging a tube and holding it to the window.

11. Concerning radiation of food to prevent spoilage, the only answer the Soviets gave was "no they did not." These answers came from three different Soviets and one would assume they were authorative; however, none of the Soviet space food or nutritional researchers were present who had been at the COSPAR meeting previously.

12. With regard to the body sensors on Soyuz 9, the unique feature was the fact that they were hung on the body by suspender-like straps over each shoulder which looked like cloth and which were fastened on to another strap which ran around the body at heart level. The entire harness could be removed simply by unfastening it or lifting it over the head. The sensors were apparently a part of the harness. This information is only from observations of the movie they showed.

13. K. Y. Kondratyev, who has often been an authorative spokesman for advanced Soviet space programs, indicated they wished to combine the brain work of man and the automatic functions of space vehicles in their space laboratories for observing earth and other planets, and to provide observations of terrestrial problems such as forest fires, dust storms, soil erosion, composition of the soil, etc. Spectrophotography and other spectrographic studies would be directed toward surface water temperature, plankton activity, earth and sea currents, volcanization, etc. Microwaves would also be utilized for atmospheric constants, earth, water and iceberg studies.

14. Dr. Gazenko indicated that his Institute of Biomedical Problems had been giving major support for the Soviet Manned missions. Incidentally, Pavel Vasilyev works in Gazenko's laboratory and seems to hold a high position. From previous observations, it is believed that the operational people are completely separated from Gazenko's laboratory and that the latter's role is support only and possibly analysis of data. The operational portion is in someone else's hands, probably the military. There is no doubt that Dr. Gazenko has increased greatly in stature during the past year or so.

15. One interesting aspect of the meeting was the general statements by the Soviets that they had no plans for a manned flight to the moon. No reason was given but it undoubtedly is many faceted.

16. Of possible interest, the Soviet delegates, including the cosmonauts,

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seemed much more willing to meet with other US and foreign delegates in the bar or anywhere else and apparently without restriction and without guarding their comments, etc. Yegorov's English is now excellent and he would often act as interpreter for other members of the Soviet group. Both Nikolayev and Sevastyanov seemed to understand a little English at times but were unable to speak more than an occasional word. They both seemed to understand German.

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